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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Tatsuki KOUWA

Appln. No. 10/022,888

Confirmation No. 2127

Filed: December 20, 2001

For: CONTROL UNIT OF A VEHICLE GENERATOR

Docket No. Q66962

Group Art Unit: 2834

Examiner: GONZALEZ, Julio C.

SUBMISSION OF APPELLANT'S BRIEF ON APPEAL

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of $330.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: June 30, 2004

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APPELLANT'S BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 1.192, Appellant submits that the following comprises the Appellant's Brief on Appeal from the Office Action dated January 12, 2004, wherein claims 1-2 and 7-10 were finally rejected. This Appeal Brief is being filed in triplicate and is accompanied by a Submission which includes the required appeal fee set forth in 37 C.F.R. § 1.17(c). Appellant's Notice of Appeal was filed on May 12, 2004. Therefore, the present Appeal Brief is timely filed.

I. REAL PARTY IN INTEREST

The real party in interest is MITSUBISHI DENKI KABUSHIKI KAISHA (Assignee) by virtue of an assignment executed by the inventor (Appellant), on October 12, 2001, and recorded by the Assignment Branch of the U.S. Patent and Trademark Office on December 20, 2001 (at Reel 012395, Frame 0048).

II. RELATED APPEALS AND INTERFERENCES

Appellant states that, upon information and belief, Appellant is not aware of any co-pending appeal or interference which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The present application was filed on December 20, 2001 with claims 1-6. Appellant filed a Response on June 9, 2003 to the Restriction Requirement dated June 10, 2003. Consequently, claims 3-6 were withdrawn from consideration as directed to a non-elected distinct invention.

In an Amendment Under 37 C.F.R. § 1.111 filed on November 21, 2003 (in response to the non-final Office Action dated August 21, 2003), Appellant added new claims 7-10. Thereafter, no further amendments have been made to claims 1-10, which are all the claims currently pending in the application.

In view of the final rejections set forth in the Office Action dated January 12, 2004, claims 1-2 and 7-10 (*see* Appendix) are the claims on appeal.

IV. STATUS OF AMENDMENTS

No after-final Amendments have been filed.

V. SUMMARY OF THE INVENTION

By way of overview, a conventional control unit of a vehicle generator capable of instantaneously stopping power generation of the vehicle generator when a key switch of the vehicle is turned off is illustrated in Appellant's Fig. 5. As shown in Fig. 5, the conventional control unit includes a control circuit 1 for controlling the generation voltage of a vehicle generator 2 (driven by an engine of the vehicle) at a predetermined voltage, a charge lamp 3, a key switch 4, a battery 5 and a power generation stop circuit 6 for stopping the power generation of the vehicle generator 2 when the key switch 4 is turned off (Appellant's specification: page 1, lines 18-23; and Fig. 5). This conventional control unit operates as follows.

The control circuit detects the voltage of the battery 5 through a voltage sensing terminal S, and when the voltage of the battery rises above a predetermined value which has been set in advance (*i.e.*, when the voltage imposed on a cathode of a Zener diode 1d rises above a Zener voltage) a transistor 1h is made conductive and a transistor 1j (which may have a Darlington connection) is made nonconductive so that a field current supplied to a field coil 2a is decreased, thus reducing the generation voltage of the generator 2 (Appellant's specification: page 2, line 23 to page 3, line 3; and Fig. 5). Conversely, when the voltage of the battery 5 lowers, the transistor 1h is made nonconductive and the transistor 1j (which may have a Darlington connection) is made conductive, whereby the field current is increased, thus raising the generation voltage of the generator 2 (*Id.*).

When the key switch 4 is turned off in order to stop the engine of the vehicle that is in operation, an off detection circuit 6a for the key switch 4 detects the turning off of the key switch 4 and makes a transistor 6b enter a conductive state, whereby contacts of a power generation stop relay 6c are turned on, thus grounding the output terminal L of an auxiliary rectifier 204 that supplies a field current to the field coil 2a (Appellant's specification: page 3, lines 4-13). As a result, current does not flow to the field coil 2a and hence power generation is stopped instantaneously (*Id.*).

In the conventional control unit of a vehicle generator, in order to stop generation of electric power instantaneously, when the key switch 4 is turned off, the relay 6c is energized to ground the output terminal L of the auxiliary rectifier 2d to interrupt the field current (Appellant's specification: page 3, lines 14-23). For this reason, at the instant when the output terminal L of the auxiliary rectifier 2d is grounded, a large current in excess of 100 amperes may flow to the auxiliary rectifier (excitation diode) 2d, depending upon the power generation state of the generator 2 (*i.e.*, the state of an electric load of the vehicle) (*Id.*). Thus, there arises a problem in that the auxiliary rectifier (excitation diode) 2d is required to have a large capacity (*Id.*).

Moreover, since a large current may flow though the relay 6c, too, the relay 6c is also required to have a large current-carrying capacity (Appellant's specification: page 3, lines 24-27). Another problem is that a large current flowing through the relay 6c generates sparks at its contacts, which gives rise to dangerous operating conditions (*Id.*).

Furthermore, in the case of using a mechanical relay, there arises additional problems such as wear of contacts, increased contact drop, etc., thus shortening the life of the vehicle system (Appellant's specification: page 3, line 28 to page 4, line 1).

In view of the above-described problems associated with a conventional control unit of a vehicle generator, exemplary embodiments of the present invention relate to an improved control unit of a vehicle generator capable of instantaneously stopping power generation of the vehicle generator in a reliable and safe manner (*i.e.*, without the need to interrupt a large current) when a key switch of the vehicle is turned off (Appellant's specification: page 1, lines 9-12).

Thus, in an illustrative embodiment of the present invention, a control unit of a vehicle generator differs from the above-described conventional control unit of a vehicle generator, for example, in that a power generation stop terminal K is added (Appellant's specification: page 7, lines 4-17). The power generation stop terminal K is connected with the control terminal of the on-off control transistor 1j (*Id.*). Additionally, the power generation stop circuit 6 is provided with a grounding transistor 6e which is made conductive based on an off detection signal of the off detection circuit 6a to ground the power generation stop terminal K (*Id.*). Furthermore, the power generation stop circuit 6 of this illustrative embodiment does not require the transistor 6b and the relay 6c of the conventional control unit (*Id.*).

When the key switch 4 of a vehicle in operation is turned off, the off detection circuit 6a for the key switch 4 detects the turning off of the key switch 4 and makes the transistor 6e assume a conductive state, such that the power generation stop terminal K of the generator is grounded to cut off the transistor 1j which serves to turn on and off a field current supplied to the

field coil 2a (Appellant's specification: page 7, lines 18-24). As a result, the vehicle generator 2 instantaneously stops generating electricity (*Id.*).

Otherwise, operations of this illustrative embodiment of the control unit of a vehicle generator are the same as those for the above-described conventional control unit (Appellant's specification: page 7, line 25 to page 8, line 6). For example, the control circuit 1 detects the voltage of the battery 5 through the voltage sensing terminal S, and when the voltage of the battery 5 rises above a predetermined value which has been set in advance, the transistor 1h is made conductive and the transistor 1j (which may have a Darlington connection) is made nonconductive, such that the field current supplied to the field coil 2a is decreased, thereby reducing the generation voltage of the vehicle generator 2 (*Id.*). Conversely, when the voltage of the battery 5 falls, the transistor 1h is made nonconductive and the transistor 1j (which may have a Darlington connection) is made conductive, such that the field current is increased, thereby raising the generation voltage of the vehicle generator 2 (*Id.*).

Therefore, in the control unit of a vehicle generator according to the illustrative embodiment of the present invention, it is unnecessary to interrupt a large current when the key switch 4 of the vehicle is turned off (Appellant's specification: page 8, lines 7-14). Accordingly, it is possible to construct the control unit using semiconductor switches (such as transistors), which are smaller in size than those of the conventional control unit (*Id.*). Therefore, it is possible to stop power generation in a reliable, safer manner with a less expensive control unit (*Id.*). Furthermore, the lifetime of the overall system can be improved (*Id.*).

VI. ISSUES

The issues on appeal are as follows:

1. Whether or not claims 1 and 2 are anticipated by Appellant's own Prior Art Disclosure (hereinafter the "PAD"), under 35 U.S.C. § 102(b).

2. Whether or not claims 7-10 are patentable over the PAD in view of U.S. Patent No. 4,618,811 to Mashino et al. (hereinafter "Mashino"), under 35 U.S.C. § 103(a).

For at least the reasons set forth in Section VIII below, Appellant respectfully submits that claims 1-2 are not anticipated by the PAD under § 102(b) and claims 7-10 are patentable over the PAD in view of Mashino under § 103(a).

VII. GROUPING OF CLAIMS

The claims do not stand or fall together and arguments for patentability of each group of claims, identified below, are set forth in Section VIII this brief.

A. Issue 1

A1. Claim 1 stands alone.

A2. Claim 2 stands alone.

B. Issue 2

B1. Claims 7-8 stand or fall together.

B2. Claim 9 stands alone.

B3. Claim 10 stands alone.

VIII. ARGUMENTS

Appellant respectfully requests the Board to reverse the Examiner's final rejections of the appealed claims for at least the following reasons.

1. Claims 1 And 2 Are Not Anticipated By Appellant's Own Prior Art Disclosure

It is respectfully submitted that the PAD does not disclose or suggest all of the features recited in claim 1. For example, claim 1 recites, *inter alia*, "a control circuit having an on-off control switching section for controlling the turning on and off of a field current of said vehicle generator...." The Examiner alleges that the PAD discloses a control unit for a vehicle generator 2 and a control circuit having an on-off switching section 1j for controlling the field current of the generator (Office Action: page 2; *citing* Appellant's specification: page 2, line 23 to page 3, line 3).

Claim 1 also requires "a power generation stop terminal for interrupting said on-off control switching section ". The Examiner alleges that the PAD discloses a power generating stop circuit 6 having an off detection circuit 6a and a power generation stop terminal 6c for interrupting the on-off control switching section (Office Action: page 2; *citing* Appellant's specification: page 1, lines 15-21; page 2, lines 14-20; and page 3, lines 3-11). Appellant respectfully disagrees.

As noted above, the Examiner alleges that the PAD discloses the on-off switching section recited in claim 1 by disclosing a transistor 1j (which may have a Darlington connection) for turning on and off the field current (*see, e.g.*, Appellant's specification: page 2, lines 8-9). Furthermore, according to the Examiner, the PAD allegedly discloses the power generation stop

terminal recited in claim 1 by describing a power generation stop relay 6c, which is energized to close its contacts thereby to ground the output terminal L when the transistor 6b is made conductive (*see, e.g.*, Appellant's specification: page 2, lines 14-20).

The power generation stop relay 6c of the PAD does not correspond to the recited power generation stop terminal of claim 1. For example, the power generation stop relay 6c of the PAD does not interrupt the on-off control switching section (*e.g.*, transistor 1j). Instead, according to the PAD, when the key switch 4 is turned off, the power generation stop relay 6c is energized to ground the output terminal L of the auxiliary rectifier 2d, thereby to interrupt a field current (Appellant's specification: page 3, lines 4-9 and 14-17).

Indeed, neither the voltage sensing terminal S nor the output terminal L (of the PAD) correspond to the power generation stop terminal of claim 1 because neither of these terminals interrupt the on-off control switching section. To the contrary, the voltage sensing terminal S is used by the control circuit 1 to detect the voltage of the battery 5 (*see* Appellant's specification: page 2, lines 23-24). Output terminal L (of the auxiliary rectifier 204) is used to interrupt a field current of the field coil 2a (*see* Appellant's specification: page 3, lines 8-9).

Furthermore, any suggestion by the Examiner that the power generation stop terminal is not disclosed structurally in the claims is incorrect (*see* Office Action: page 5). Claim 1 clearly recites "a power generation stop terminal for interrupting said on-off control switching section". For example and not by way of limitation, Appellant's Fig. 1 clearly illustrates such a stop terminal K that can interrupt an on-off control switching section, *e.g.*, on-off control transistor 1j

(*see also* Appellant's specification: page 7, lines 20-23: grounding stop terminal K interrupts transistor 1j to turn off a field current supplied to the field coil 2a).

Additionally, claim 2 recites that "said power generation stop circuit comprises a grounding switching section which is operated based on an off detection signal from said off detection circuit to ground said power generation stop terminal." The Examiner alleges that the PAD discloses these features of claim 2 by disclosing that a power generation stop relay circuit has a grounding switching section (*e.g.*, power generation stop relay 6c) (Office Action: page 2; *citing* Appellant's specification: page 3, lines 5-11 and 14-17; and Fig. 5).

To the contrary, the grounding of output terminal L does not, for example, ground the control terminal of transistor 1j. Indeed, because of the problems with the prior art approach, the control unit of claim 2 does not involve the interruption of a large current when the key switch 4 of the vehicle is turned off (*see, e.g.*, Appellant's specification: page 8, lines 7-14). Instead, the control unit of claim 2 grounds a power generation stop terminal to directly interrupt the on-off control switching section (*e.g.*, transistor 1j).

In view of the above, it is respectfully submitted that claims 1 and 2 are not anticipated by the PAD.

2. Claims 7-10 Are Patentable Over The Examiner's Proposed Combination Of Appellant's Own Prior Art Disclosure And Mashino

Mashino fails to make up for the above-described deficiencies of the PAD. For example, Mashino fails to teach or suggest "a power generation stop terminal for interrupting said on-off control switching section", as recited in claim 1. Neither terminal F nor terminal L, which the

Examiner characterizes as being related to the stopping of power generation (*see* Office Action: page 4), correspond to the recited power generation stop terminal.

To the contrary, terminal F connects a Darlington-connection power transistor 13 and a field coil 2 (Mashino: col. 2, lines 56-59). In this manner, a voltage regulator 6 including the Darlington-connection power transistor 13 can control the current flowing through the field winding 2 and regulate the output voltage of the generator (Mashino: col. 2, lines 41-44). The terminal F does not interrupt the Darlington-connection power transistor 13.

Terminal L is connected to terminal F by a flywheel diode 14 such that when the power transistor 13 is turned off, the flywheel diode 14 circulates the current flowing through the field winding 2 and prevents the occurrence of a high voltage in the field winding 2 (Mashino: col. 2, lines 59-64). The terminal L itself does not interrupt the power transistor 13.

Therefore, it is respectfully submitted that claims 7-10 are patentable over the Examiner's proposed combination of the PAD and Mashino at least by virtue of their dependency, as well as the additional features recited therein.

For example, claim 9 recites that "said power generation stop terminal is directly connected to said switch" of claim 7. In the PAD, neither terminal L nor terminal S is directly connected to the transistor 1j (*see* Appellant's Fig. 5). In Mashino, terminal F (illustrated in the voltage regulator 6 of Fig. 2) is directly connected to the power transistor 13. As noted above, however, terminal F of Mashino does not correspond to the recited power generation stop terminal. Thus, the Examiner's proposed combination of the PAD and Mashino does not teach or suggest a power generation stop terminal that is directly connected to said switch.

Furthermore, claim 10 recites that "said power generation stop terminal is directly connected to a control terminal of the Darlington transistor" of claim 8. In the PAD, neither terminal L nor terminal S is directly connected to a control terminal of the Darlington transistor 1j (*see* Appellant's Fig. 5). In Mashino, only F is directly connected to the power transistor 13, which is a Darlington transistor; however, terminal F is not directly connected to a control terminal of the Darlington transistor 13. Furthermore, as noted above, terminal F does not correspond to the recited power generation stop terminal. Thus, the Examiner's proposed combination of the PAD and Mashino does not teach or suggest a power generation stop terminal that is directly connected to said switch.

IX. CONCLUSION

In conclusion, Appellant respectfully requests the members of the Board to reverse the rejections of the appealed claims and to find each of the claims allowable as defining subject matter that is patentable over the art of record.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. §1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: June 30, 2004

APPENDIX

CLAIMS 1-2 AND 7-10 ON APPEAL:

1. A control unit of the vehicle generator comprising: a vehicle generator;

a battery adapted to be charged by an output of said vehicle generator;

a control circuit having an on-off control switching section for controlling the turning on and off of a field current of said vehicle generator, said control circuit being operable to interrupt said on-off control switching section when a detected voltage of said battery is higher than a reference voltage, and make said on-off control switching section conductive thereby to control the voltage of power generation at a predetermined voltage when the detected voltage of said battery is below said reference voltage;

a power generation stop circuit having an off detection circuit for detecting turning off of a key switch of a vehicle, said power generation stop circuit being operable to stop the power generation of said vehicle generator when said off detection circuit detects the turning off of said vehicle key switch; and

a power generation stop terminal for interrupting said on-off control switching section; wherein said power generation stop circuit controls said power generation stop terminal to stop the power generation of said vehicle generator instantaneously when said off detection circuit detects the turning off of said vehicle key switch.

2. The control unit of a vehicle generator according to claim 1, wherein said power generation stop circuit comprises a grounding switching section which is operated based on an off detection signal from said off detection circuit to ground said power generation stop terminal.

7. The control unit of a vehicle generator according to claim 1, wherein said on-off control switching section includes a switch for switching the field current of said vehicle generator to one of an on state and an off state.

8. The control unit of a vehicle generator according to claim 7, wherein said switch is a Darlington transistor.

9. The control unit of a vehicle generator according to claim 7, wherein said power generation stop terminal is directly connected to said switch.

10. The control unit of a vehicle generator according to claim 8, wherein said power generation stop terminal is directly connected to a control terminal of the Darlington transistor.